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WAX AS A CELL MATERIAL.

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In the mounting of dry objects a cell is usually required of considerably greater depth than that necessary for sections of animal or vegetable tissues. The methods described in most text-books of making deep cells by numerous layers of cement, after each layer of which the cement must be allowed to harden before the next can be added, is altogether too slow and laborious a process to be followed if any other successful plan is possible. Various forms of ready-made cells have been suggested, such as glass or metal rings, etc., but there are many objections to their use on account of their cost, the necessity of keeping quite a stock on hand so as to have various depths and diameters, the difficulty of obtaining them at all except in large cities, etc. What is needed for making deep cells is a material that is easily worked and yet is sufficiently hard to enable us to form a cell of any required depth at one operation, and it is also desirable that this material be at the same time cheap and easily obtained. In my own experience I have not been able to find any substance which answers all these requirements so satisfactorily as the sheet wax used largely in making artificial flowers, and which was first suggested years ago by Prof. H. L. Smith. It was not long after its recommendation by Professor Smith, before he found that objects mounted dry in wax cells were liable to become obscured by the condensation on the inside of the cover-glass of volatile matter from the wax itself, and its use for mounting dry objects has since been generally condemned.

Several years ago, after some experience with dry mounts, the writer felt the great advantage of wax over other cell-making material on account of the ease and quickness with which it could be used in the production of even the deepest cells. The idea then suggested itself that by simply covering the inner surface of the wax cell with a thorough coating of good cement the escape of volatile

matter from the wax and the consequent clouding of the cover-glass would be prevented. Acting on this idea I have mounted during the last few years some two thousand dry objects in wax cells, and have not seen a single case of the so-called "sweating" out of the whole number; and this, in spite of the fact that in hundreds of cases not only the cell walls but the entire background of the cell as well, was composed of wax. This uniform success in the use of cells made of wax makes it pretty certain that any one can reach the same results with a little care, and at the request of some of our members a description of the method used will be given.

The sheet wax of various colors can be had from dealers in artists' supplies, and the colors used will of course depend on the taste of the user. White, yellow, red, green and blue give fine results. The purchaser should always ask for fresh wax, as it usually hardens and becomes somewhat brittle with age. This is especially the case with green. When it does harden or where only old wax can be had, it may be softened by warming slightly. In cutting rings from the wax, punches of various sizes are needed and a full supply of them can be made for a few cents by using a set of the ordinary brass ferrules as described by me in Proceedings of this Society for 1884. Before punching the wax it should be placed one sheet above another till the required thickness is obtained for the cells desired. The heat of the hand pressed on the sheets is usually sufficient to make the sheets stick together. In the arrangement of the colored sheets there is room for quite a range of effects. If the wax is too hard to stick by the simple heat of the hand a slight warming at some distance from a flame will cause them to cohere without the use of cement between them.

While cutting rings from the wax it is best to put a number of the usual glass slides on a warming table, or the edge of stove or furnace register, where they will be moderately heated, so that the wax ring when placed in the center of the slide will stick firmly but will not melt. When the rings are punched out and the slides warmed ready for them, clean a slide rapidly with a dry cloth and place it on the turn-table. Take a wax ring and press it upon the center of the slide as indicated by the concentric circles ruled on the face of the turn-table. The warmth of the finger pressing the

wax upon the slide, together with the warmth of the slide itself, causes the ring to be firmly cemented to the glass.

The turn-table is now revolved rapidly and a sharp pen-knife held against the inner and then the outer edge of the wax ring till they are both turned to a perfect circle and are beautifully rounded or beveled. When a satisfactory shape has been obtained, a coat of transparent cement should be laid on at once both inside and out and the slide should then be covered from the dust to dry. If a quick drying cement is used the cell will be ready for the reception of an object in a few hours, but it is safest to make up a number of cells at once and let them stand a few days before using. Before mounting, the position of the slide within the cell and upon which the object is to be placed should be thoroughly cleaned. This can usually be quickly done by rolling up a small piece of dry silk and rubbing the glass with the small end so as not to disturb the walls of the cell. As soon as the glass is thoroughly clean it must be covered with a watch-glass to prevent dust from settling into it, and in all the operations of mounting the greatest care should be taken to avoid exposing the object to the dust longer than absolutely necessary. Many fine objects are greatly disfigured by careless exposure to dust during mounting. When the object is placed in the cell and secured by a minute drop of cement ready for the cover-glass, a thin coating of cement must be given to the top of the cell wall so that the cover-glass will adhere firmly. The cover-glass must now be thoroughly cleaned, and this is a point that seems to occasion considerable trouble to many, if we are to judge by the frequent complaints made of the breaking of covers during cleaning. Some years ago, in a microscopical journal, it was recommended to use two blocks of wood whose smooth sides were covered with chamois skin, and between which the cover was rubbed. A trial of such blocks showed that the dirty side of the cover or the one which needed most cleaning would stick to the chamois skin and remain unmoved while the comparatively clean side would receive all the scouring. A trial of various plans resulted in the adoption of the simplest. The covers are allowed to remain uncleaned in their boxes till wanted for use. If they are all cleaned at first as sometimes recommended, still another cleaning is then

necessary at the last moment before using. When the cell is ready for the cover a glass of the proper diameter is taken between the thumb and first finger of the left hand and is rubbed on both sides with a brush dipped in alcohol. As soon as the glass appears clean to the eye, and this is usually after one stroke of the brush on each side, a dry piece of silk is taken in the right hand and the cover-glass is placed in the folds of silk between the thumb and finger and rubbed a few times till the alcohol is removed and the glass dried. The cover should now be held up to the light at an angle so that any grains of dust that may be present are distinctly seen and may be removed with a camel's-hair brush. When perfectly clean the cover is instantly placed on the cell and a slight pressure with the finger given to insure the union of the glass with the thin coat of cement previously applied. It is the habit of the writer to apply the finishing coat of cement at once after making sure that the cover-glass has adhered firmly all around the cell; and if a quick drying varnish like shellac is used this course is perfectly safe, and the slide is completed at once. If the cement used should tend to run in when applied immediately after putting on the cover, of course it would be necessary to defer the finishing coat for a few hours.